

Applicant : Stromblad
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SB/UP

Amendments to the Drawings:

A new sheet of drawing containing only Fig. 2A is enclosed herewith as Replacement Sheet 3 of 5.

Also, the attached Replacement Sheet 5 of 5 includes a new Fig. 6 and replaces the original sheet which had only Figs. 4 and 5.

Attachments following last page of this Amendment:

Replacement Sheets (5 pages)

REMARKS

Claims 12-22 were examined and remain pending, unamended. The title, the specification and the Abstract have been changed. Five sheets of replacement drawing are attached. No new matter has been added.

Drawings

The drawings were objected to as not showing features of the claims, for three reasons:

- a. the flow passages of the plate heat exchanger of claim 1 [*sic*, 12].
- b. counter flow or parallel flow of claim 22.
- c. the helical shaped conduit of claim 19.

Regarding objection a: Applicant respectfully refers to first passages 18 and second passages 19 which are already illustrated in existing Fig. 3.

Regarding objection b: A new sheet containing Fig. 2A is attached hereto as Replacement Sheet 3 of 5 and illustrates a counter flow device.

Regarding objection c: New Fig. 6 has been added in the attached Replacement Sheet 5 of 5 and illustrates a helical shaped conduit.

In view of the above additions and comments, it is urged that the drawings now overcome the objections raised in the Action.

Specification

The Title of the invention and the Abstract were objected to. The Title suggested in the Action has been adopted and a new Abstract has been presented. It is urged that the indicated objections have been overcome by the amendments.

Claim Rejections – 35 USC § 103

Claims 12-15 and 20-22 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fuerschbach (US 4,815,534) in view of Takao et al. (JP 09-138008).

Claims 16 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fuerschbach (above) in view of Takao et al. (above) and further in view of Watanabe et al. (US 6,928,833).

Claims 18 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fuerschbach (above) in view of Takao et al. (above) and further in view of Dienhart et al. (US 6,189,334).

The rejections are respectfully traversed.

Pending claim 12 is the only independent claim, and it is directed to a heat transfer device comprising a plate heat exchanger (10). The plate heat exchanger includes a package (11) of heat transfer plates. Between adjacent plates are first passages (18) for a heat transfer medium to be cooled and second passages (19) for a cooling agent. First and second porthole channels (21 and 22) communicate with first passages (18), while third and fourth porthole channels (23 and 24) communicate with second passages (19). First porthole channel (21) forms at least part of an inlet channel (31) for supplying heat transfer medium, and second porthole channel (22) forms at least part of an outlet channel (32) for the heat transfer medium. Third porthole channel (23) forms at least part of an inlet channel (33) for supplying cooling agent, while fourth porthole channel forms at least part of an outlet channel (34) for the cooling agent. The device includes a conduit (5) which extends into the inlet channel (33) for the cooling agent. The conduit (5) also includes a conduit portion (6) which extends into and back out of the outlet channel (34) for the cooling agent, thus permitting heat exchange between the cooling agent within the conduit portion (6) and the cooling agent that surrounds conduit portion (6) within the outlet channel (34). (*See, generally, applicant's Fig. 3.*) As is explained in the application (page 4, lines 1-19), this device allows the temperature of the cooling agent which is leaving the outlet channel (34) to be raised by coming into heat transfer contact with the relatively warmer cooling agent within the conduit portion (6) and has the beneficial effect of reducing or preventing liquid droplets from exiting the heat exchanger in the cooling agent. In turn, this can extend the lifetime and the efficiency of the equipment.

The Action asserts that Fuerschbach discloses much of the claimed device, but fails to disclose “that wherein the conduit includes a conduit portion extending into and out of the outlet channel for the cooling agent such that heat exchange takes place between the cooling agent in the conduit portion and the cooling agent in the outlet channel.” (Action, page 5, paragraph bridging pages 5 and 6) Because Fuerschbach is concerned only with the structure of a plate heat exchanger as such, there is no disclosure, teaching or suggestion in the reference for one of ordinary skill in the art concerning how to provide or arrange a conduit or conduit portion for cooling agent as called for by the pending claims.

The Action then refers to Takao et al. and states (Action, page 5) that Takao et al. “teaches wherein the conduit includes a conduit portion (ref 9) extending into and out of the outlet channel for the cooling agent such that heat exchange takes place between the cooling agent in the conduit portion and the cooling agent in the outlet channel (abstract; Figure 1 illustrates that a portion of the conduit 8a goes into one side of the heat exchanger 3 before entering the expansion valve Exp1. The heat exchanger has two inlets, air inlet and refrigerant inlet, and two outlets, air outlet and refrigerant outlet. The conduit 9 enters the air outlet portion, which is the cooling agent. This [...] outlet would be analogous to the fourth porthole channel of a plate heat exchanger).”

Applicant disagrees that Takao et al. discloses the feature not disclosed in Fuerschbach. Moreover, it appears to applicant that the device illustrated in Takao et al. Fig. 4 is the closest Takao et al. embodiment to the pending claims. The cooling circuit shown in Fig. 4 comprises a four-way valve (2) which is configured in such a way that the flow direction of the cooling medium can be changed. In one valve position, the cooling medium is conveyed from the compressor (1) to the heat exchanger (5), which forms an evaporator. From the evaporator (5), the cooling medium is then conveyed in piping (9) into the heat exchanger (3), which forms a condenser. From piping (9), the cooling medium is conveyed to the expansion valve (7a) and from there to the condenser before the cooling medium is returned to the compressor (1). Although there are some similarities, Takao et al. does not disclose or suggest that the piping (9) is conveyed into and out of an outlet channel for the cooling medium. The outlet of the

condenser is separate from piping (9), and is provided at the lower end of the condenser. As is clear from the above description, Takao et al. cannot disclose or suggest to one of ordinary skill in the art to provide heat exchange between the cooling medium in piping (9) in an outlet channel leading away from the heat exchanger (3). There would have been no reason to modify the Takao et al. device to arrive at the arrangement in applicant's claimed device. This same conclusion is reached, even with regard to Fig. 1 of Takao et al., which is referred to in the Action.

Therefore, the invention claimed in pending claim 12 would not have been obvious to one of ordinary skill in the art at the time the claimed invention was made. It is urged therefore that claim 12 is allowable over the cited references.

Since claims 13-22 all depend directly or indirectly from claim 12, they are also allowable. The disclosures of Watanabe et al. and Dienhart et al. are cited only for certain features called for by dependent claims 16-17 and 18-19, respectively. These references do not disclose or suggest the features missing from the combination of Fuerschbach and Takao et al. The cited art, whether taken in combination or individually, does not disclose or suggest a solution to the problem dealt with by applicant, namely, reducing the presence of liquid droplets in the cooling agent leaving the plate heat exchanger, and does not disclose or suggest the claimed invention.

Conclusion

In any event, for at least the reasons indicated above, all pending claims are allowable and the issuance of a notice of allowance is proper and is urged.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this

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paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

This paper is being filed on the Electronic Filing System (EFS). No fee is due. Should the undersigned be mistaken in this regard, however, please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

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